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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,817	10/14/2003	Akira Iriguchi	501558.20004	5270

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EXAMINER	
MRUK, GEOFFREY S	

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 12/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/685,817	IRIGUCHI, AKIRA
	Examiner	Art Unit
	Geoffrey Mruk	2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 August 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 October 2003* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Shimosato et al. (US 5,428,382).

With respect to claim 1, Shimosato discloses an ink-jet printing head (Column 1, lines 7-12) comprising

- a flow-passage unit (Figure 5, element 13) and an actuator unit (Figure 5, element 14) laminated on each other,
- said flow-passage unit having nozzles (Figure 5, element 15), pressure chambers (Figure 5, element 16) communicating with said nozzles, respectively, and
- a common manifold (Fig. 5, element 17) communicating with an ink supply source (Fig. 5, element 17a), and
- said actuator unit being operable to apply pressure to ink in each pressure chamber, and wherein each of said pressure chambers communicates at one of opposite longitudinal ends (Fig. 5, element 18) thereof with a corresponding one of said nozzles (Column 7, lines 34-61), and

- at the other of said opposite longitudinal ends with said common manifold, and is formed so as to be open in one of opposite surfaces of said flow-passage unit, such that said each pressure chamber is partially defined by said actuator unit (Fig. 5, element 21),
- said flow passage unit having for each nozzle one and only one flow passage for communication between said each nozzle and said common manifold through a corresponding one of said pressure chambers (Column 7, lines 3-33),
- wherein each of said pressure chambers has a depth of 35μm - 45μm (Column 9, lines 55-59) in a direction perpendicular to said one of opposite surfaces of said flow-passage unit.

With respect to claim 2, Shimosato discloses said flow-passage unit (Figure 5, element 13) includes a first plate (Fig. 5, element 13) through which said pressure chambers (Fig. 5, element 16) are formed, a second plate (Fig. 5, side wall of element 18) formed with said ink supply source (Fig. 5, element 17a), and a third plate (Fig. 5, element 14, i.e. element 14 forms the forth side of element 15) formed with said nozzles (Fig. 5, element 15), said first plate being fixed to said actuator unit and said second plate being sandwiched by said first and third plates.

With respect to claim 3, Shimosato said actuator unit (Fig. 5, element 14) includes a plurality of piezoelectric sheets (Fig. 1, element 19) that are stacked while sandwiching a plurality of individual electrodes (Fig. 1, element 24) and a common electrode (Fig. 1, element 25) alternately, said actuator unit having a plurality of active

portions (Fig. 5, element 21) that are defined over said respective pressure chambers (Fig. 5, element 16) by said stacked individual electrodes and said common electrodes and are deformable to apply the pressure to the ink in said respective pressure chambers (Column 7, lines 34-61).

With respect to claim 4, Shimosato discloses a depth of said each pressure chamber (Fig. 1, element 16) is selected within a range of 37μm - 43μm (Column 9, lines 55-59).

With respect to claim 5, Shimosato discloses a depth of said each pressure (Fig. 1, element 16) chamber is selected within a range of 38μm - 42μm (Column 9, lines 55-59).

With respect to claim 6, Shimosato discloses a depth of said each pressure chamber (Fig. 1, element 16) is selected within a range of 39μm - 41μm (Column 9, lines 55-59).

With respect to claim 7, Shimosato said each pressure chamber (Fig. 1, element 16) has a width of 150μm - 300μm (Column 9, lines 55-59) in a direction perpendicular to a longitudinal direction thereof in which said opposite longitudinal ends are opposed to each other.

With respect to claim 8, Shimosato said each pressure chamber (Fig. 1, element 16) has a length of 1.0 mm-4.0 mm (Column 8, lines 1-12) in a longitudinal direction thereof in which said opposite longitudinal ends are opposed to each other.

With respect to claim 9, Shimosato discloses a depth of said each pressure chamber (Fig. 1, element 16) is about 40μm (Column 9, lines 55-59).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimosato et al. (US 5,428,382) in view of Morikoshi et al. (US 6,382,754 B1).

With respect to claim 10, Shimosato discloses each pressure chamber (Figure 1, element 16) has a width of about 250μm (Column 9, lines 55-59) in a direction perpendicular to a longitudinal direction thereof in which said opposite longitudinal ends are opposed to each other, and a length of about 1.8mm (Column 8, lines 1-12) in said longitudinal direction

Shimosato does not expressly disclose an ink-jet printing head being capable of ejecting droplets of the ink from the nozzles at a velocity of about 9 m/sec when the actuator unit is driven at a maximum drive frequency of about 24 kHz with a driving voltage of about 20.5 V.

Morikoshi discloses pressure chambers (Figure 1, element 3) that are about 250μm in width (Column 7, line 5), about 1.8mm in length (Column 7, line 5), and the inkjet print head being capable of ejecting droplets of the ink from the nozzles at a velocity of about 9 m/sec (Figure 11) when the actuator unit is driven at a maximum drive frequency of about 24 kHz (Column 10, lines 66-67; Column 11, lines 1-3).

At the time of the invention it would have been obvious to one of ordinary skill in the art to use the pressure generating chamber's width and length dimensions disclosed by Morikoshi in the inkjet print head of Shimosato. The motivation for doing so would have been to provide an inkjet printing device that is driven at high speed while being free from generating ink mist (Column 3, lines 9-25).

It would have been obvious to one having ordinary skill in the art, at the time of invention was made, to incorporate a drive voltage of 20.5 V when the actuator unit is driven at a maximum frequency of 24 kHz, since it has been held that it is not inventive to discovering and optimum value or workable ranges by routine experimentation. In re Aller, 105 USPQ 233 (CCPA1955).

Response to Arguments

Applicant's arguments, see page 6 lines 1-15, filed 22 August 2005, with respect to the rejection(s) of claim(s) 1 under 35 USC § 102b have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Shimosato et al. (US 5,428,382).

Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection. The applicant's argument that "Even though the reference teaches the broad desirable or preferred range, this teaching does not necessarily mean the teaching that the relatively narrow specific range of 35-45μm is important. Nowhere in the reference is a teaching that the 35-45μm range is important

for excellent quality of printing by the ink-jet printing head in general at high printing speed and at a high drive frequency with low drive voltage" is not persuasive. The claimed range of 35-45μm is within the expected range of 20-200μm disclosed by Shimosato, and is merely a tuning of the range disclosed by Shimosato.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is 571 272-2810. The examiner can normally be reached on 7am - 330pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

12/7/05

MANISH S. SHAH
PRIMARY EXAMINER

GSM
12/5/2005

GM